March 2014

Installation Manual

EXCELSIOR Unvented Water Heater

Water heating systems

fabdec

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1. Introduction

The Excelsior unvented water heater is a high quality stainless steel unvented cylinder which can provide hot water from a cold mains water supply of between 1.5 bar and 16 bar.

The indirect heat exchanger surfaces are designed to provide a rapid heat up time. The unit comes complete with all the necessary safety equipment to comply with legislation governing the installation of such systems.

The Excelsior Solar and Heat Pump unvented water heaters have been designed for use with all solar panels and ground or air source heat pump systems requiring a storage and heating vessel (please ensure compatibility prior to installation).

1.1 Specifier's Guide

The Law & Unvented

It is legal to fit an unvented unit into any property.
There is no longer a requirement to have an old-fashioned 'Tank in the Roof' system.

The Benefits of Excelsior

Duplex stainless steel

High quality finish

Low heat loss for maximum economy

No sacrificial anode - low maintenance

The Benefits of Unvented Systems

The Excelsior fills a bath in minutes and can run two at the same time

The Excelsior can work off electricity (Economy 7) or alternative energy systems*

A power shower without the noisy pump

No tanks in the roof

No ball cocks to jam or leak

All your water, hot and cold, direct from the mains

Site the Excelsior unvented water heater wherever convenient*

*not suitable for solid fuel boilers. *refer to 'Siting the Excelsior unit' in section 3.1

Excelsior Solar

The Excelsior solar range is available in many vessel capacities, in both direct (electric) or indirect models. Each cylinder has been specifically designed for use with an alternative energy heating system and includes a large corrugated coil heat exchanger that provides optimum heat transfer from the alternative heat source to the water in the cylinder.
The Excelsior solar unvented water heater should only be used as part of a solar installation and configured as shown. Additional safety devices may be required if the cylinder is operated with other heat sources.

Excelsior Heat Pump

The Excelsior Heat Pump range has been specifically designed to optimise the output from the heat pump. It is fitted with a corrugated coil heat exchanger that has a larger diameter than that used on the standard Excelsior cylinders.

Always ensure the correct type of cylinder is paired with the renewable heat source. Failure to do this may result in the system being inefficient and in extreme cases cause failure of components. Consult the heat pump/solar installation manual prior to cylinder installation.

1.2 Standard Equipment

Check that all the components of your Excelsior unit are contained in the kit prior to installation.

Your Excelsior should include the following:

3kW heating element - incorporating control thermostat and re-settable safety cut-out

Combination (control) valve comprising:

Line strainer, non-return (check) valve, pressure reducing valve & expansion relief valve

Tundish - 15mm female x 22mm female

Temperature/Pressure relief valve - set at 90°C and 7 bar pressure (factory fitted)

Cylinder thermostat - temperature control setting 30-70°C (indirect units only)

Thermal cut-out - set to operate at 82°C +/-5°C (indirect units only)

Expansion vessel - with capacity to suit vessel size (external expansion units only)

Motorised valve (indirect units only)

2. Dimensions and Performance

The diagrams on the following pages show the standard range of Excelsior vessels.

All dimensions are in millimeters unless otherwise stated. (Tolerance +/- 10mm)

All unvented installations must comply with local building regulations.
England & Wales: G3 Building Regulations
Scotland: Technical Standard P3
Northern Ireland: Building Regulation P5

Excelsior coil data is based on a max primary flow temperature of 80°C.
Water flow and return temperature differential of 20°C.
It is recommended that the back pressure in the coil is restricted to 0.3bar. (See table below for flow rates)

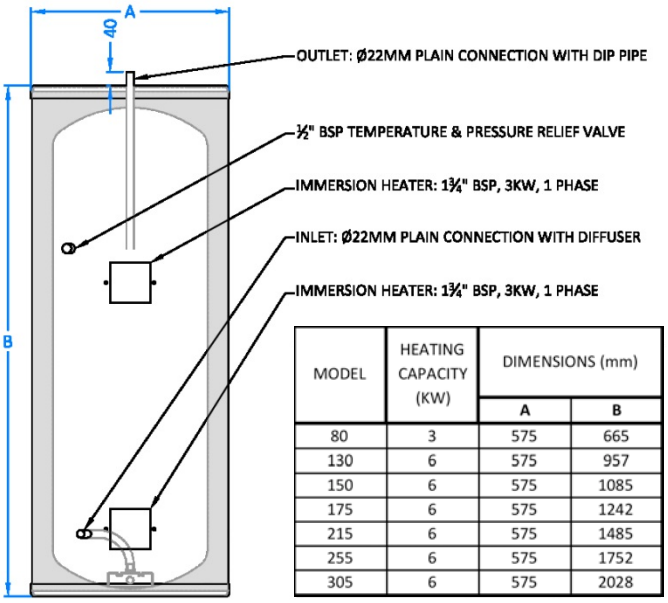
Coil information

Coil size / Maximum coil output (kW):	Approximate coil surface area (sq. m):	Approximate coil volume (Ltrs):	Recommended flow rates through coil. (Ltrs/Min):
DN20 / 14	0.54	2.0	24
DN20 / 20	0.75	3.0	19
DN20 / 30	1.10	4.0	16.5
DN25 / 54	2.00	9.5	28
DN25 / 81	3.00	14.5	23.5

Note: The vessel working volume is the gross volume minus the displaced volume of any coil heat exchanger or internal air gap.

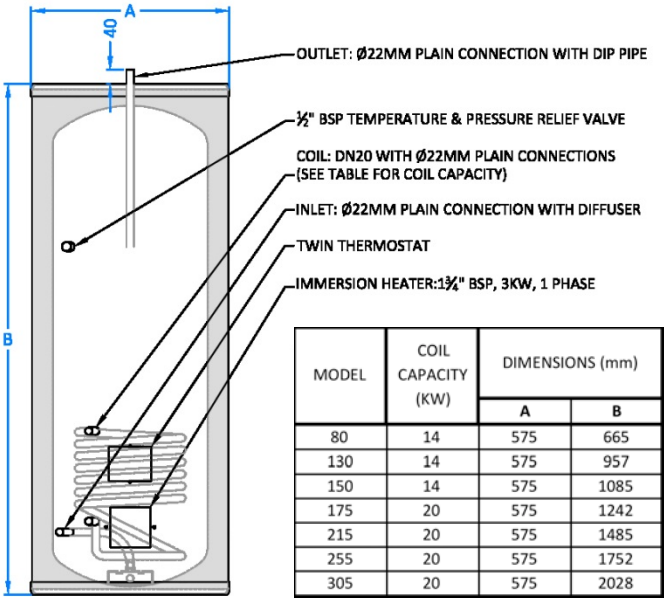
2.1 Excelsior Direct and Indirect Cylinders-Internal

Excelsior Direct Cylinder with internal expansion


A
40
B
OUTLET: Ø22MM PLAIN CONNECTION WITH DIP PIPE
½" BSP TEMPERATURE & PRESSURE RELIEF VALVE
IMMERSION HEATER: 1¾" BSP, 3KW, 1 PHASE
INLET: Ø22MM PLAIN CONNECTION WITH DIFFUSER
IMMERSION HEATER: 1¾" BSP, 3KW, 1 PHASE

MODEL	HEATING CAPACITY (KW)	DIMENSIONS (mm)	
		A	B
80	3	575	665
130	6	575	957
150	6	575	1085
175	6	575	1242
215	6	575	1485
255	6	575	1752
305	6	575	2028

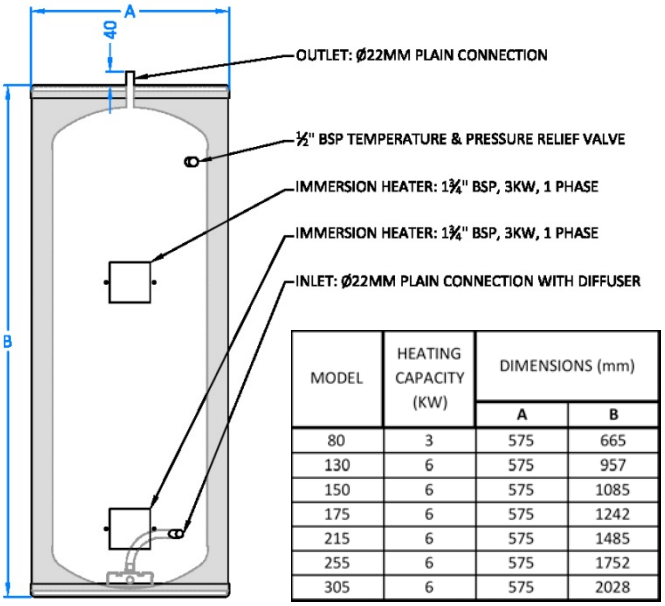
Excelsior Indirect Cylinder with internal expansion


A
40
B
OUTLET: Ø22MM PLAIN CONNECTION WITH DIP PIPE
½" BSP TEMPERATURE & PRESSURE RELIEF VALVE
COIL: DN20 WITH Ø22MM PLAIN CONNECTIONS
(SEE TABLE FOR COIL CAPACITY)
INLET: Ø22MM PLAIN CONNECTION WITH DIFFUSER
TWIN THERMOSTAT
IMMERSION HEATER:1¾" BSP, 3KW, 1 PHASE

MODEL	COIL CAPACITY (KW)	DIMENSIONS (mm)	
		A	B
80	14	575	665
130	14	575	957
150	14	575	1085
175	20	575	1242
215	20	575	1485
255	20	575	1752
305	20	575	2028

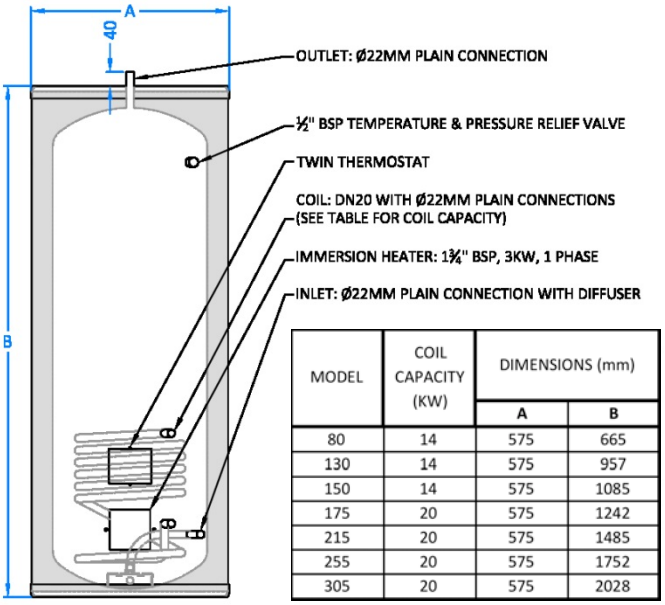
2.2 Excelsior Direct and Indirect Cylinders-External

Excelsior Direct Cylinder with external expansion


A
40
B
OUTLET: Ø22MM PLAIN CONNECTION
½" BSP TEMPERATURE & PRESSURE RELIEF VALVE
IMMERSION HEATER: 1¾" BSP, 3KW, 1 PHASE
IMMERSION HEATER: 1¾" BSP, 3KW, 1 PHASE
INLET: Ø22MM PLAIN CONNECTION WITH DIFFUSER

MODEL	HEATING CAPACITY (KW)	DIMENSIONS (mm)	
		A	B
80	3	575	665
130	6	575	957
150	6	575	1085
175	6	575	1242
215	6	575	1485
255	6	575	1752
305	6	575	2028

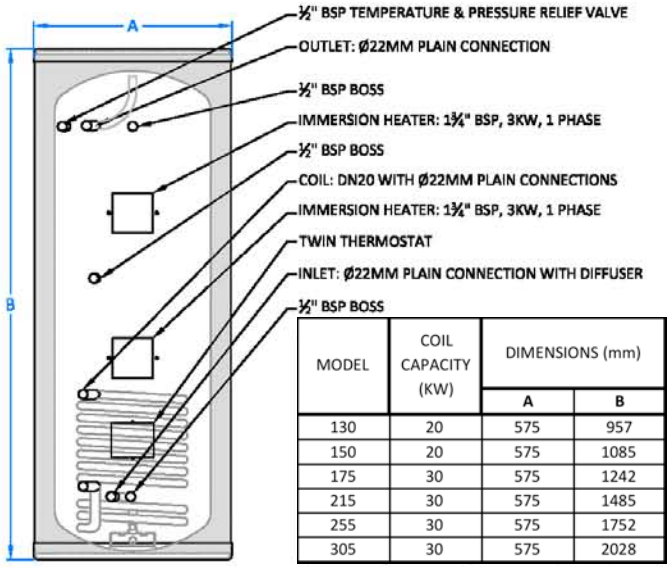
Excelsior Indirect Cylinder with external expansion


A
40
B
OUTLET: Ø22MM PLAIN CONNECTION
½" BSP TEMPERATURE & PRESSURE RELIEF VALVE
TWIN THERMOSTAT
COIL: DN20 WITH Ø22MM PLAIN CONNECTIONS
(SEE TABLE FOR COIL CAPACITY)
IMMERSION HEATER: 1¾" BSP, 3KW, 1 PHASE
INLET: Ø22MM PLAIN CONNECTION WITH DIFFUSER

MODEL	COIL CAPACITY (KW)	DIMENSIONS (mm)	
		A	B
80	14	575	665
130	14	575	957
150	14	575	1085
175	20	575	1242
215	20	575	1485
255	20	575	1752
305	20	575	2028

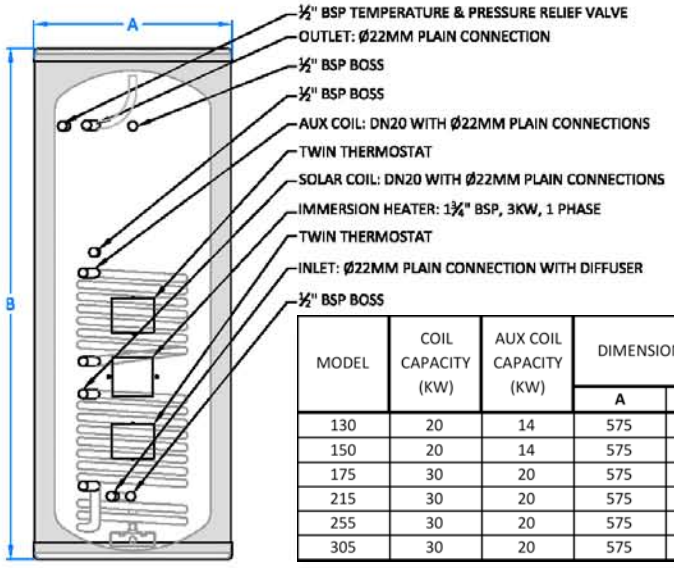
2.3 Excelsior Solar Range

Excelsior Solar Direct Cylinder with external expansion


A
B
½" BSP TEMPERATURE & PRESSURE RELIEF VALVE
OUTLET: Ø22MM PLAIN CONNECTION
½" BSP BOSS
IMMERSION HEATER: 1¾" BSP, 3KW, 1 PHASE
½" BSP BOSS
COIL: DN20 WITH Ø22MM PLAIN CONNECTIONS
IMMERSION HEATER: 1¾" BSP, 3KW, 1 PHASE
TWIN THERMOSTAT
INLET: Ø22MM PLAIN CONNECTION WITH DIFFUSER
½" BSP BOSS

MODEL	COIL CAPACITY (KW)	DIMENSIONS (mm)	
		A	B
130	20	575	957
150	20	575	1085
175	30	575	1242
215	30	575	1485
255	30	575	1752
305	30	575	2028

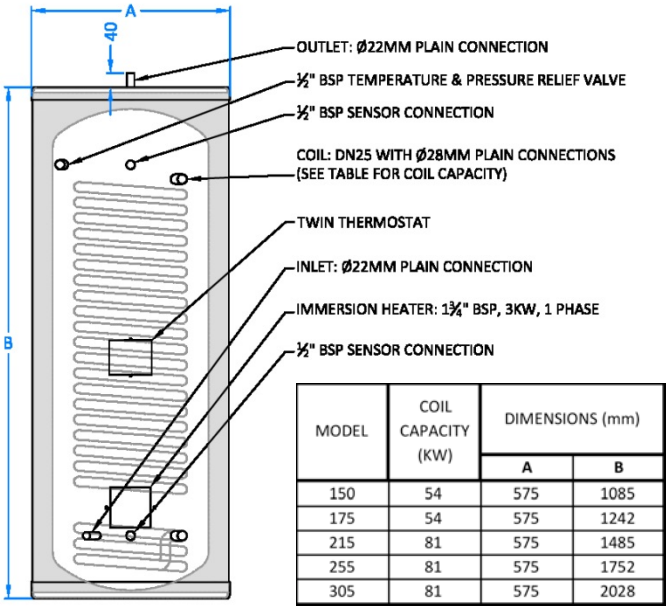
Excelsior Solar Indirect Cylinder with external expansion


A
B
½" BSP TEMPERATURE & PRESSURE RELIEF VALVE
OUTLET: Ø22MM PLAIN CONNECTION
½" BSP BOSS
½" BSP BOSS
AUX COIL: DN20 WITH Ø22MM PLAIN CONNECTIONS
TWIN THERMOSTAT
SOLAR COIL: DN20 WITH Ø22MM PLAIN CONNECTIONS
IMMERSION HEATER: 1¾" BSP, 3KW, 1 PHASE
TWIN THERMOSTAT
INLET: Ø22MM PLAIN CONNECTION WITH DIFFUSER
½" BSP BOSS

MODEL	COIL CAPACITY (KW)	AUX COIL CAPACITY (KW)	DIMENSIONS (mm)	
			A	B
130	20	14	575	957
150	20	14	575	1085
175	30	20	575	1242
215	30	20	575	1485
255	30	20	575	1752
305	30	20	575	2028

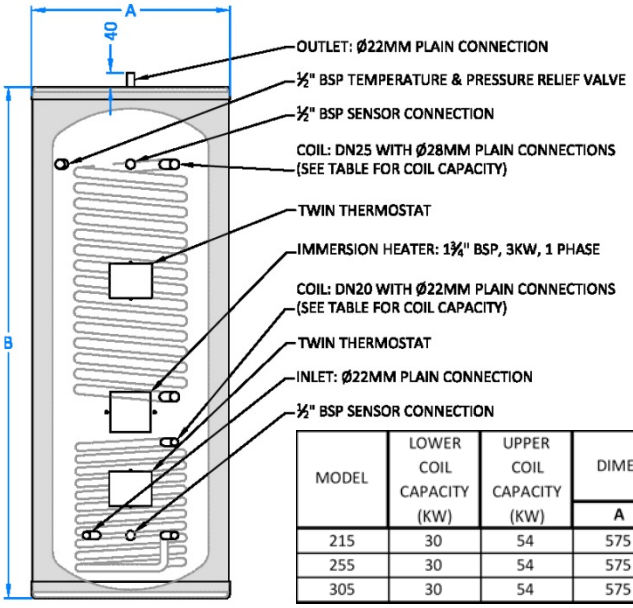
2.4 Excelsior Heat Pump Range

Excelsior Heat Pump Cylinder (single coil) with external expansion



MODEL	COIL CAPACITY (KW)	DIMENSIONS (mm)	
		A	B
150	54	575	1085
175	54	575	1242
215	81	575	1485
255	81	575	1752
305	81	575	2028

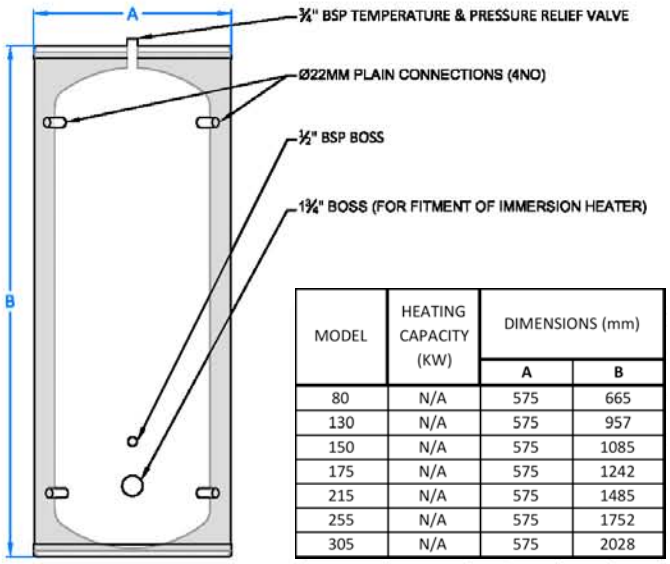
Excelsior Heat Pump Cylinder (twin coil) with external expansion



MODEL	LOWER COIL CAPACITY (KW)	UPPER COIL CAPACITY (KW)	DIMENSIONS (mm)	
			A	B
215	30	54	575	1485
255	30	54	575	1752
305	30	54	575	2028

2.5 Excelsior Buffer Range

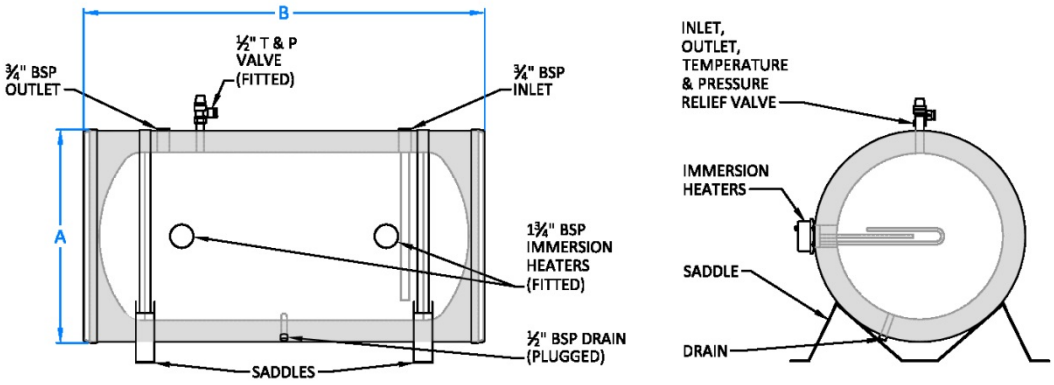
Excelsior Buffer Cylinder with external expansion



MODEL	HEATING CAPACITY (KW)	DIMENSIONS (mm)	
		A	B
80	N/A	575	665
130	N/A	575	957
150	N/A	575	1085
175	N/A	575	1242
215	N/A	575	1485
255	N/A	575	1752
305	N/A	575	2028

2.6 Excelsior Horizontal Direct Range

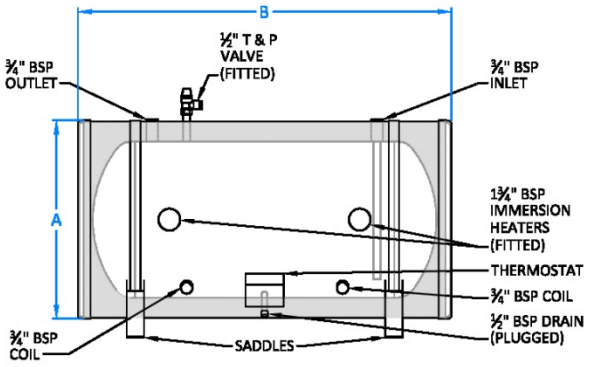
Excelsior Horizontal Direct Cylinder with external expansion

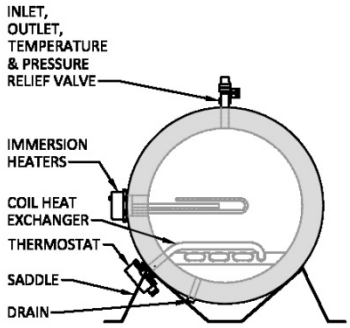


MODEL	HEATING CAPACITY (KW)	DIMENSIONS (mm)	
		A	B
130	6	575	957
150	6	575	1085
175	6	575	1242
215	6	575	1485
255	6	575	1752
305	6	575	2028

2.7 Excelsior Horizontal Indirect Range

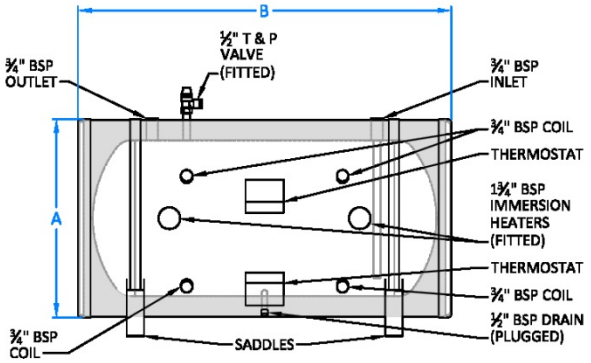
Excelsior Horizontal Indirect Cylinder with external expansion

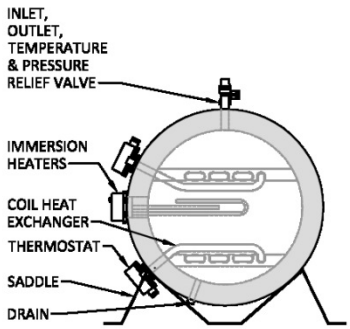




MODEL	HEATING CAPACITY (KW)	DIMENSIONS (mm)	
		A	B
130	6	575	957
150	6	575	1085
175	6	575	1242
215	6	575	1485
255	6	575	1752
305	6	575	2028

Excelsior Horizontal Twin Coil Cylinder with external expansion





MODEL	HEATING CAPACITY (KW)	DIMENSIONS (mm)	
		A	B
130	6	575	957
150	6	575	1085
175	6	575	1242
215	6	575	1485
255	6	575	1752
305	6	575	2028

3. Installation Instructions

3.1 Installation Requirements

WARNING: UNDER NO CIRCUMSTANCES MUST THE FACTORY FITTED TEMPERATURE PRESSURE RELIEF VALVE BE REMOVED. THIS WILL INVALIDATE ANY GUARANTEE OR CLAIM. THE COLD-WATER INLET VALVE ASSEMBLY MUST BE FITTED OR THE EXCELSIOR UNIT WILL NOT PERFORM SATISFACTORILY.

DO NOT ATTEMPT TO VENT THE PRIMARY CIRCUIT THROUGH THE EXCELSIOR UNIT.
ALL EXTERNAL HEAT SOURCES SHOULD BE INSTALLED TO MANUFACTURERS INSTRUCTIONS AND THE PRIMARY CIRCUIT THROUGH THE EXCELSIOR UNIT MUST BE PUMPED.

Benchmark Scheme Checklist

Benchmark places responsibilities on both manufacturers and installers. The purpose is to ensure that customers are provided with the correct equipment for their needs, that it is installed, commissioned and serviced in accordance with the manufacturer's instructions by competent persons. The Benchmark Code of Practice is available from the Heating and Hot Water Industry Council, who manage and promote the scheme. Visit www.centralheating.co.uk for more information.

Please ensure that the installer has fully completed the Benchmark Checklist on the inside back pages of the installation instructions supplied with the product and that you have signed it to say that you have received a full and clear explanation of its operation. The installer is legally required to complete a commissioning checklist as a means of complying with the appropriate Building Regulations (England and Wales).

All installations must be notified to Local Area Building Control either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer who should, on receipt, write the Notification Number on the Benchmark Checklist.

Siting the Excelsior unit

Note: Excelsior cylinders are designed for indoor use only

The unit can be placed anywhere convenient. Since it is connected directly to the mains water supply it is equally efficient on any floor – ground, first or second. Avoid areas that may be subject to frost. Try to keep pipe runs as short as possible for maximum economy, especially hot water discharge pipes running down from the Excelsior unit.
The unit can be fitted into a conventional airing cupboard and does not require any additional insulation.

The water supply to the cylinder should be potable water direct from a public mains supply with any water treatment equipment functioning correctly.

Vertical cylinders
If installing a vertical cylinder, ensure it is fixed securely in an upright position for correct operation.

Horizontal cylinders
If installing a horizontal cylinder, ensure it is fixed securely with the temperature and pressure relief valve positioned at the top for correct operation.

Storage & Handling

If the cylinder is not being installed immediately, it should remain in its protective wrapping with all pipe end protective caps in place to prevent damage.

Connecting the Water Supply

Pipework is not supplied.
All pipework should be installed using good plumbing practice. We recommend 22mm mains cold water supply is used. Install a stop cock valve before the cold water inlet assembly on the incoming mains water supply so the unit can be isolated if required.

Cold Water Valve
The combined cold water valve (supplied) can be connected anywhere on the cold water mains prior to the unit. It can be located at a point near to where the mains supply enters the premises if this is more convenient. When installing the cold water valve, ensure that the arrow is pointing in the same direction as the mains water supply flow when connecting (see figures 5 and 6).
The cold water balancing port, on the valve, allows you to connect the cold water mains to the rest of the property thus giving balanced pressure throughout. If this facility is not required leave the cap on.

Check Water Pressure & Flow Rates
Fabdec suggests 1.5 bar pressure & 20 litres/minute flow rate to be the minimum requirements for satisfactory operation. The unit will still operate below this, but it will not be possible to run two or more outlets at the same time.
The mains supply must not exceed 3 bar. If it does a special pressure-reducing valve will be required.
Consideration should be given to the routing of the discharge pipe and the location of the solar panel or alternative energy source where applicable.

Drain Tap
A drain tap to drain the unit must be fitted to the cold-water inlet pipe between the Excelsior cylinder and the cold water valve assembly at its lowest level possible (see figures 2, 3 and 5).

Pipework to Taps
Ideally a 22mm pipe should supply the outlets throughout the property with short lengths (max 1 metre) runs of 15mm going to baths, showers, and basin taps. Smaller bore pipe can be used to suit taps.

Taps & Fittings
All taps and fittings incorporated into the unvented system should have a rated operating pressure of 7 bar or above.

Inlet Group
The inlet group will vary depending on whether the vessel is fitted as internal or external expansion (see figures 2, 3, 5 and 6).

Primary Circuit
The motorised valve supplied and the thermal cut-out (high limit stat) must be fitted to the primary flow (Use compression fittings only).

Operation of the cut-out & motorised valve
To comply with regulations and to prevent the temperature reaching 100°C the thermal cut-out supplied must be fitted. The thermal cut-out is wired in series to the cylinder thermostat. When the thermal cut-out senses an abnormal rise in temperature in the primary flow the electrical supply to the motorised valve will be cut and the valve will return to the closed position. This will cut-off the primary water from the boiler to the indirect coil in the cylinder.
If the thermal cut-out operates it must be reset manually. Check the cylinder stat and/or boiler stat.

Primary Circuit (Excelsior Solar)
Excelsior solar cylinders are suitable for connecting to a solar collector system and, where a twin coil is present (indirect) to a gas or oil central heating boiler.

WARNING: SOLID FUEL OR WOOD BURNING BOILERS AND GRAVITY CIRCULATION SYSTEMS MUST NOT BE USED ON THE PRIMARY CIRCUIT OF AN UNVENTED HOT WATER SYSTEM.

The cylinder should be installed in accordance with the solar installation instructions for connection to the primary flow and return.
The Excelsior Solar range must only be connected to solar installations containing a hydraulic station with two non-return valves (one in the flow to the collector and one in the return). This will prevent thermal siphoning of the heat transfer fluid when the pump is switched off.
Where two non-return valves are not present or a hydraulic station is not used in the solar system, a second two-port valve must be installed into the flow of the solar coil and wired to the lower two-port valve.
The Excelsior Solar is supplied with one two-port motorised valve which should be connected in the flow to the auxiliary coil and wired to the upper twin thermostat of the cylinder.
Solar pump: The lower twin thermostat should be connected in line with the solar pump power supply.

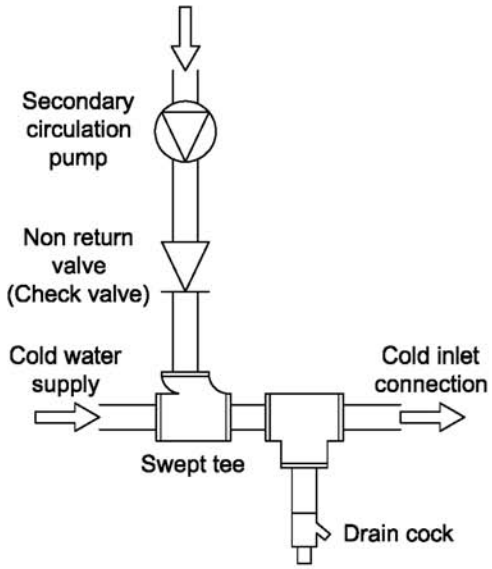
The factory fitted temperature and pressure relief valve should not be removed from the cylinder or tampered with in any way. The valve is pre-calibrated to open at 7 bar or 90°C and any attempt to adjust it will invalidate the warranty and could affect the safety performance of the unit.

Secondary Return (where applicable)

Some Excelsior cylinders are fitted with a secondary return connection. Secondary circuit connections must be made to the cylinder in accordance with the recommended installation diagram. A drain cock (not supplied) should be fitted in the cold water inlet to facilitate draining of the cylinder (see Figure 1). A swept tee* is needed for all indirect models if secondary circulation is required and is fitted as per the illustration. A non-return valve* must also be fitted to prevent backflow. A pump* will be required to circulate the hot water. The return feed is in 15mm pipe and all work can be done on site. *not supplied

IMPORTANT: IF A SECONDARY CIRCULATION CIRCUIT IS INSTALLED THEN A LARGER EXPANSION VESSEL MAY BE REQUIRED TO HANDLE THE INCREASE IN WATER VOLUME. CALCULATE THE ADDITIONAL WATER VOLUME AND CONTACT OUR CUSTOMER SERVICES DEPARTMENT REGARDING SUITABLE VESSEL SIZES.

Figure 1. Secondary Return



External Expansion Vessel (where applicable)

This smaller tank is connected to the cold-water inlet side of the vessel. Mount the tank according to separate manufacturer's instructions provided with the external expansion vessel.

A suitable expansion vessel with a pre-charge pressure of 3.5 bar is supplied with Excelsior cylinders with external expansion.

The expansion vessel should be Tee'd off between the pressure relief valve and the cylinder (see figure 2) and should always be positioned with the entry point at the bottom. Installation should always be by means of a standard T connector ensuring no other valve is between this and the cylinder. Adjust the pressure to 3.0 - 3.5 bar.

3.2 Recommended Installation Schematics

Figure 2. Installation Schematic – External Expansion

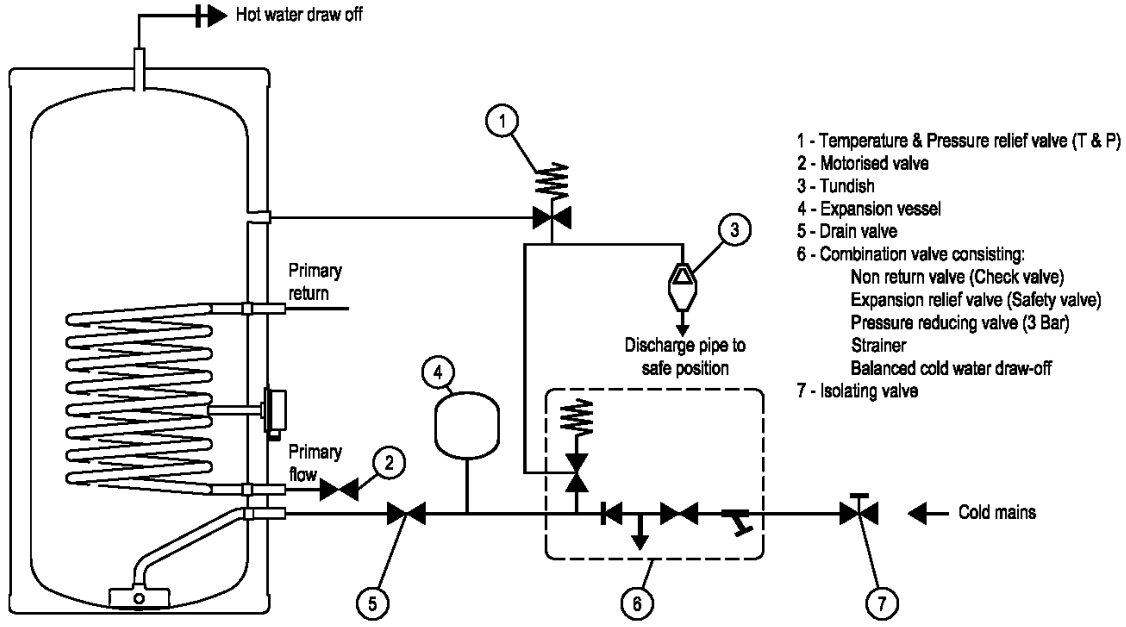


Figure 3. Installation Schematic – Internal Expansion

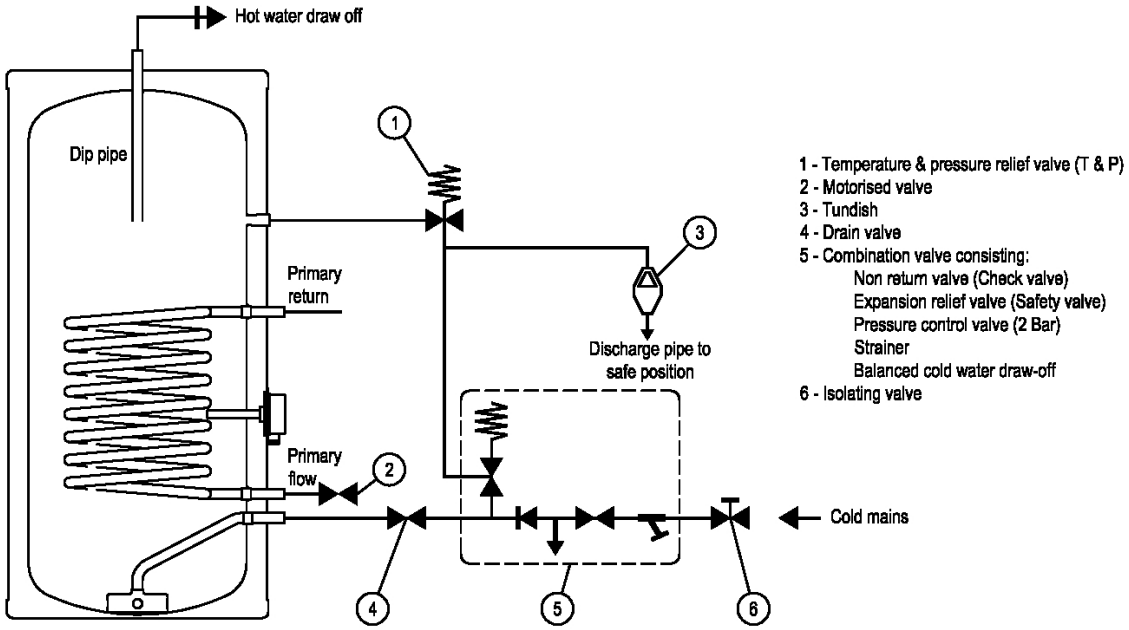


Figure 4. Combination Valve

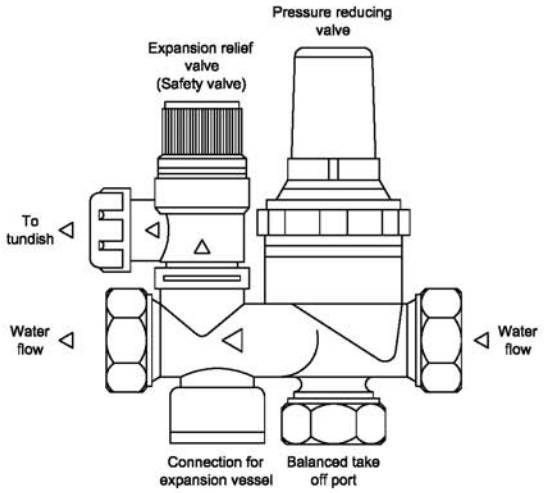


Figure 5. Inlet Group – External Expansion

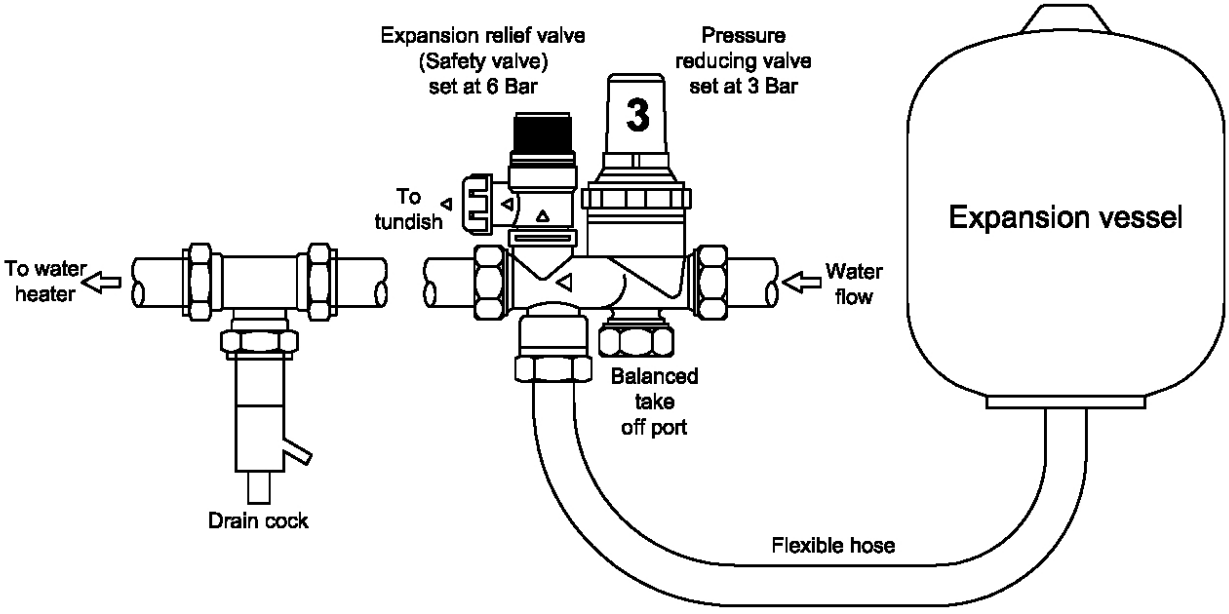
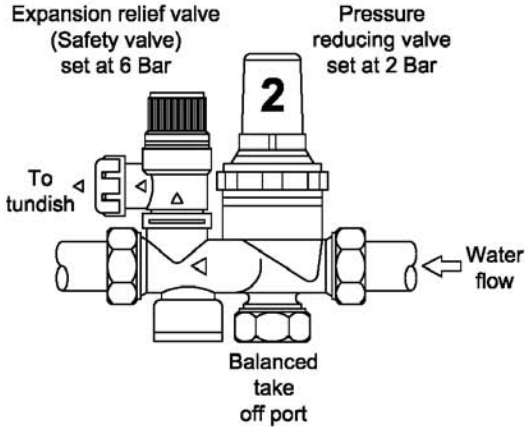


Figure 6. Inlet Group – Internal Expansion


Expansion relief valve (Safety valve) set at 6 Bar
Pressure reducing valve set at 2 Bar
2
To tundish
Water flow
Balanced take off port

3.3 Wiring Instructions

WARNING: ALL ELECTRICAL WIRING SHOULD BE CARRIED OUT BY A COMPETENT ELECTRICAL CONTRACTOR AND MUST CONFORM TO THE LATEST IEE WIRING REGULATIONS. DO NOT SWITCH THE POWER ON UNTIL THE UNIT HAS BEEN FILLED WITH WATER AND ALL WIRING HAS BEEN EARTHED. (SEE FIGURES 7, 8, 9 & 10)

Figure 7. S Plan Wiring Diagram

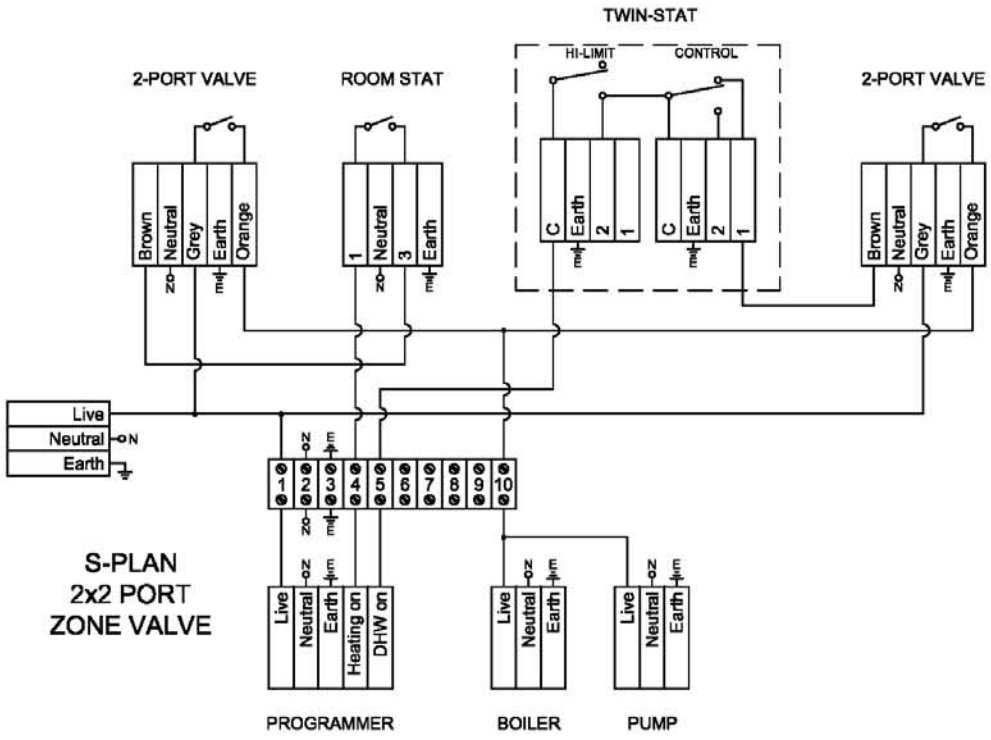
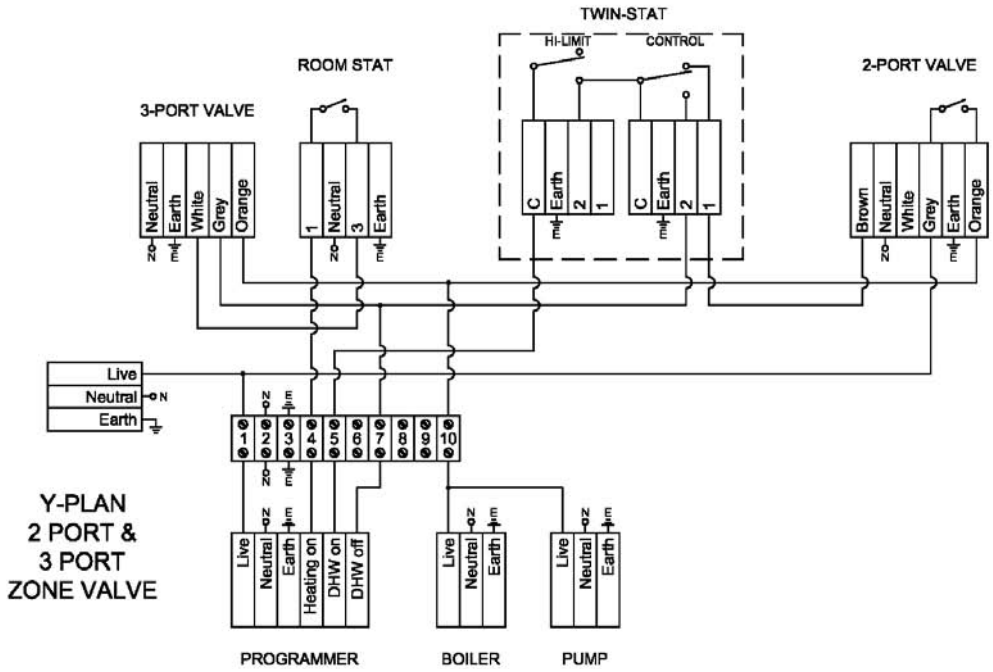


Figure 8. Y Plan Wiring Diagram



Fitting the immersion heaters

The heating element is fitted with a control thermostat which allows the water temperature to be set and a thermal cut-out for safety (see Figure 9). The unit is designed to screw into the 1¾" boss fitted to the unit. An 'O' ring is supplied as the seal and must be fitted against the flange of the element. **Take care not to cross thread and DO NOT use any other type of seal.**

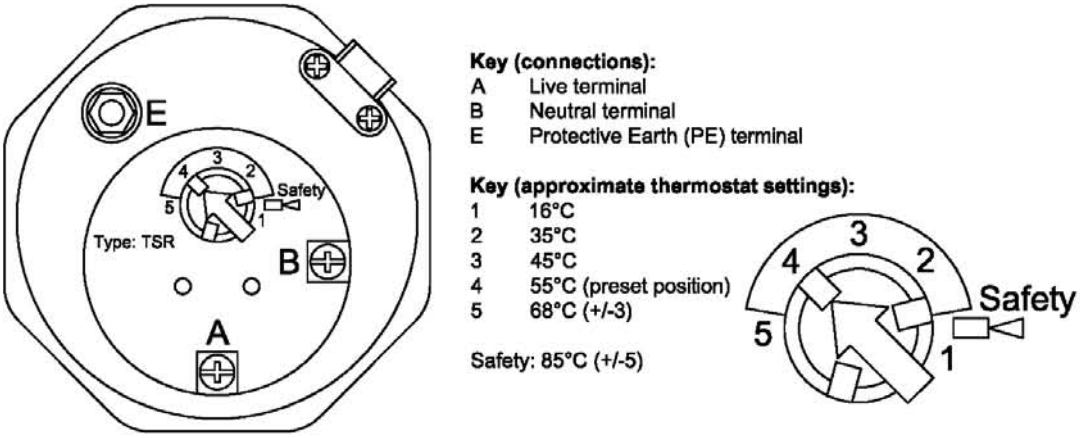
Replacement elements can be obtained through your authorised service agent.

Immersion Heater (Excelsior Solar)

Secondary circuit connections MUST be made to the cylinder in accordance with the recommended installation diagram. A drain cock* should be fitted in the cold water inlet to facilitate draining of the cylinder. * Not supplied.

IMPORTANT: ENSURE THAT THE IMMERSION HEATER THERMOSTAT IS SET TO A MAXIMUM OF 60°C.

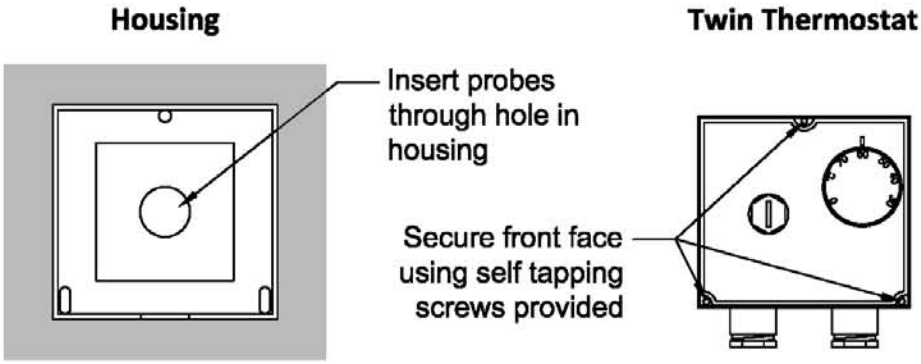
Figure 9. Immersion Heater Connections and Control Thermostat Settings



Fitting the twin thermostat

Figure 10. Cylinder Thermostat & Thermal Cut-out Connections

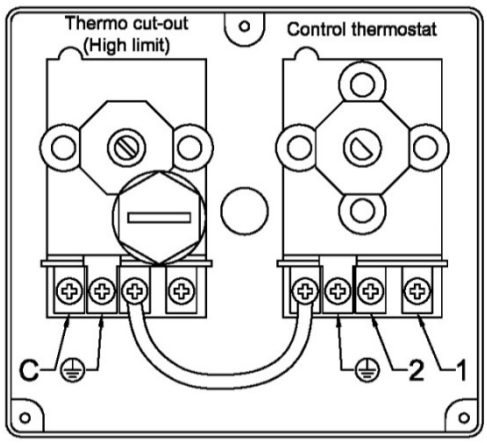
(Refer to wiring diagrams for correct installations)



Two Port Valve

The two port valve should be wired to the thermostat (see Figure 7 or 8 depending on required configuration). Connect the live supply to the thermo cut-out and connect the brown wire of the two port valve to terminal 1 on the thermostat (see Figure 11). Earth and Neutral supplies can be connected directly to the valve. The orange wire of the two port valve should be connected to the central heating boiler and the cylinder thermostat set to 60°C. The power supply to the pump station should be connected via the lower valve

Figure 11. Twin thermostat wiring



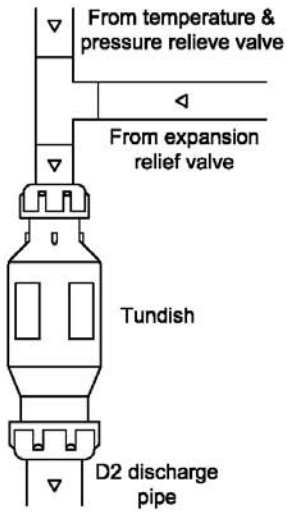
3.4 Tundish

The tundish supplied must be fitted so it is visible to the occupier. The discharge pipe must be 22mm copper pipe. Regulations do not permit more than 3 x 90-degree bends between the Excelsior unit and the outflow. Between the temperature & pressure relief valve and the first 90-degree bend there must be a fall of at least 300mm. The fall of the pipework must be continuous and the pipe should terminate in the gully or be bent backwards onto an outside wall, in a place where discharge cannot be injurious to persons.

If you need to site the Excelsior unit in the middle of the house your discharge pipe to the tundish can be as far away as 9m, which in most cases is enough to run the final discharge point. After 9m, increase the pipe size to a greater diameter than 22mm and accordingly for subsequent 9m lengths, (see table 1).

Figure 12. Tundish Installation

IMPORTANT: REGULAR CHECKS SHOULD BE CARRIED OUT TO ENSURE THAT THE EXPANSION VESSEL IS ALWAYS CORRECTLY PRESSURISED TO 3.5 BAR.



3.5 Discharge Pipework

G3 Requirement

'...there shall be precautions...to ensure that the hot water discharged from safety devices is safely conveyed to where it is visible but will not cause danger to persons in or about the building.'

G3 Guidance Section 3.5

The discharge pipe (D1) from the vessel up to and including tundish is generally supplied by the manufacturer of the hot water storage system. Where otherwise the installation should include the discharge pipe(s) (D1) from the safety device(s). In either case the tundish should be vertical, located in the same space as the unvented hot water storage system and be fitted as close as possible to, and lower than, the safety device, with no more than 600mm of pipe between the valve outlet and the tundish (See Figure 13).

The discharge pipe (D2)

The discharge pipe (D2) from the tundish should:
Have a vertical section of pipe at least 300mm long below the tundish before any elbows or bends in the pipework (see Figure13).
Be installed with a continuous fall of at least 1 in 200 thereafter.

The discharge pipe (D2) should be made of metal or other material that has been demonstrated to be capable of safely withstanding temperatures of the water discharged and is clearly and permanently marked to identify the product and performance standard (e.g. as specified in the relevant part of BS 7291-1:2006 Thermostatic pipes and fittings for hot and cold water for domestic purposes and heating installations in buildings, General Requirements).

Termination of discharge pipe

The discharge pipe (D2) from the tundish should terminate in a safe place where there is no risk to persons in the vicinity of the discharge.

Examples of acceptable discharge arrangements are:
To a trapped gully with the end of the pipe below a fixed grating and above the water seal.
Downward discharges at low level; i.e. up to 100mm above external surfaces such as car parks, hard standings, grassed areas etc. are acceptable providing that a wire cage or similar guard is positioned to prevent contact, whilst maintaining visibility.

Discharges at high level: e.g. into a metal hopper and metal downpipe with the end of the discharge pipe clearly visible or onto a roof capable of withstanding high temperature discharges of water and 3m from any plastic guttering system that would collect such discharges.

The discharge would consist of high temperature water and steam. Asphalt, roofing felt and non-metallic rainwater goods may be damaged by such discharges

Worked Example of Discharge Pipe Sizing

The example below is for a G1/2 temperature relief valve with a discharge pipe (D2) having 4 No elbows and length of 7m from the tundish to the point of discharge. From table 1: (overleaf)

Maximum resistance allowed for a straight length of 22mm copper discharge pipe (D2) from G1/2 temperature relief valve is 9m. Subtract the resistance for 4 No 22mm elbows at 0.8m each = 3.2m, therefore the permitted length equates to 5.8m. This is less than the actual length of 7m therefore calculate the next largest size.

Maximum resistance allowed for a straight length of 28mm pipe (D2) from a G1/2 temperature relief valve equates to 18m Subtract the resistance of 4 No 28mm elbows at 1m each = 4m.

Therefore the maximum permitted length equates to 14m. As the actual length is 7m a 28mm (D2) copper pipe will be satisfactory.

Figure 13. Typical discharge pipe arrangement

IMPORTANT: THE DISCHARGE WILL CONSIST OF SCALDING WATER AND STEAM. ASPHALT, ROOFING FELT AND NON-METALLIC RAINWATER GOODS MAY BE DAMAGED BY SUCH DISCHARGES.

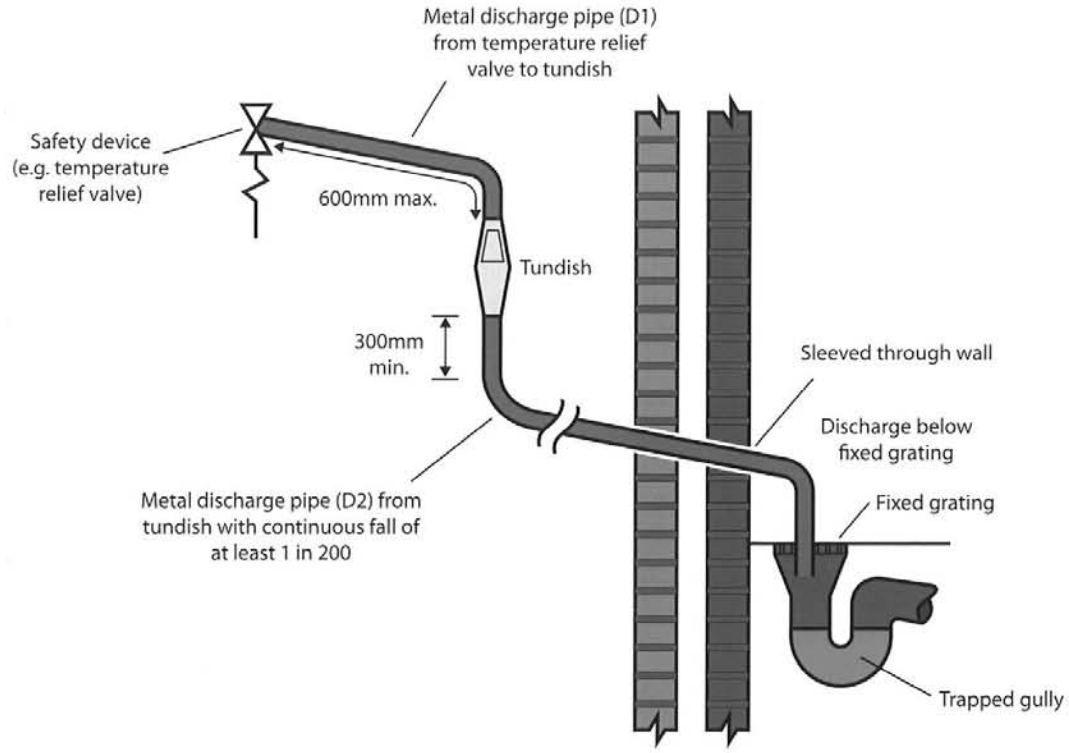

Metal discharge pipe (D1) from temperature relief valve to tundish
Safety device (e.g. temperature relief valve)
600mm max.
Tundish
300mm min.
Sleeved through wall
Discharge below fixed grating
Fixed grating
Metal discharge pipe (D2) from tundish with continuous fall of at least 1 in 200
Trapped gully

Table 1. Sizing of copper discharge pipe (D2) for common temperature & pressure relief valve sizes

Valve outlet size	Minimum size of discharge pipe D1	Minimum size of discharge pipe D2	Minimum resistance allowed, expressed as a length of straight pipe (i.e. no elbows or bends)	Resistance created by each elbow or bend
G ½	15mm	22mm	Up to 9m	0.8m
		28mm	Up to 18m	1.0m
		35mm	Up to 27m	1.4m
G ¾	22mm	28mm	Up to 9m	1.0m
		35mm	Up to 18m	1.4m
		42mm	Up to 27m	1.7m
G 1	28mm	35mm	Up to 9m	1.4m
		42mm	Up to 18m	1.7m
		54mm	Up to 27m	2.3m

3.6 Commissioning

Commissioning a newly installed cylinder with an internal or external air gap

1. Before turning on the mains supply to the cylinder, a hot water tap should be opened, preferably on the same floor or the floor below where the cylinder is located.
2. Turn on the supply to the cylinder and fill until water runs from the open hot water tap.
3. Close the hot water taps and bring the cylinder up to working pressure.

Draining

Switch off electrical power to the immersion heaters and/or shut down the boiler. Close the stopcock valve to isolate the Excelsior unit.

Attach a hosepipe to the drain cock having sufficient length to take water to a suitable discharge point.

Open the drain cock.

Open the hot water tap nearest to the Excelsior unit. If water fails to drain from the Excelsior unit, vent the system by opening the temperature and pressure relief valve.

Scale

In hard water areas lower water temperatures can result in less scale being deposited.

If a water softener is used it should be capable of flows of approximately 50Ltrs/min, this will maintain maximum performance of the Excelsior unit.

If no descaler or softener is used then the heating element(s) will need descaling periodically for maximum efficiency and to prevent damage.

User Instructions

Fabdec Limited is a licensed member of the Benchmark Scheme, which aims to improve the standards of installation and commissioning of domestic heating and hot water systems in the UK and to encourage regular servicing to optimise safety, efficiency and performance.

Your Excelsior unvented hot water cylinder has been designed to give many years of trouble free service and is made from hygienic, high grade stainless steel. Where applicable, it includes a 3kW electric immersion heater which heats the water to 60°C once pre-heating of the solar system is completed (Excelsior Solar only).

The flow temperature of the hot water can be set to your requirements on the immersion heater (ideally 60°C maximum). Higher temperatures can cause tripping of the high limit thermostat and introduce more energy loss from the cylinder.

When a hot tap is turned on there may be a short surge of water, this is quite normal with unvented systems and does not mean there is a fault.

When you first fill a basin the water may sometimes appear milky. This is due to very tiny air bubbles in the water which will clear very quickly.

WARNING: IF COLD/WARM WATER EXITS FROM THE TEMPERATURE AND PRESSURE RELIEF VALVE (TPV) OR FROM THE PRESSURE RELIEF VALVE (PRV) CALL YOUR INSTALLER OR THE EXCELSIOR CUSTOMER SERVICE CENTRE. IF VERY HOT WATER EXITS FROM EITHER VALVE SWITCH OFF THE HEAT SOURCE IMMEDIATELY AND ISOLATE THE ELECTRICITY SUPPLY TO THE CYLINDER AND SEPARATE HEAT SOURCE.

THE SOLAR SYSTEM IS CONFIGURED TO HEAT THE WATER TO ITS MAXIMUM ECONOMIC TEMPERATURE WHICH MAY VARY WITH AMBIENT TEMPERATURE AND WEATHER CONDITIONS. THE IMMERSION MAY BE PROGRAMMED TO OPERATE DURING FIXED PERIODS OF THE DAY OR NIGHT.

IF THE HOT WATER RUNS COOL IT MAY BE NECESSARY TO MANUALLY SWITCH ON THE IMMERSION TO HEAT THE WATER – PLEASE SEE THE RELEVANT INSTRUCTIONS FOR YOUR ALTERNATIVE ENERGY DEVICE.

4. Warranty

Fabdec Ltd guarantee the immersion(s) and controls for a period of 1 year from date of purchase, excluding any failure caused by lime-scale, providing that they have been installed for their intended use by a competent person and have not been modified in any way.

In addition Fabdec Ltd guarantees domestic stainless steel inner hot water cylinders for a period of 25 years and commercial cylinders for 5 years from the date of purchase against faulty material or manufacture provided that:

a) The vessel has been installed by a competent person in accordance with this manual and all current regulations and codes of practice in place at the time of installation.

b) It has been used solely for the purpose of heating potable water that complies with current (at the time of installation) EU standards and is not fed with water from a private source.

c) It had not been modified in any way.

d) It has not been subjected to excessive pressure or electrolytic action from dissimilar materials, or attack from any salt deposits.

e) It has been installed indoors in a frost-free environment.

f) The cylinder is connected to a public water supply maintained by a local water authority.

g) The warranty card is completed and returned to Fabdec Ltd within 90 days of installation.

h) The unit has been serviced annually.

i) The log book has been filled in after each annual service.

This warranty is not transferable and does not include claims due to frost or lime scale damage.

This guarantee does not cover a procedure of flushing the system not in accordance to the WRAS guidelines pertaining to BS 6700.

Proof of purchase will be required for any claim. This guarantee does not affect your statutory rights.

5. Servicing & Maintenance

Servicing and maintenance should only be carried out by a competent unvented hot water installer or Fabdec Ltd authorised personnel.

Before any work is carried out on the installation, it must be isolated from the electricity supply.
Both the primary and secondary systems will contain very hot water that will scald, therefore care should be taken when opening any joints, seals or valves.

Only use spare parts authorised by Fabdec Ltd. The use of other parts will invalidate the warranty.

Excelsior cylinders utilising internal expansion will require checking periodically to ensure the air gap is sufficient. If the air gap requires replenishing, follow the steps listed in the Commissioning section.

This product should be serviced regularly to optimise its safety, efficiency and performance. The service engineer should complete the relevant Service Record on the Benchmark Checklist after each service.

Replacing air gap if lost during service (internal air gap – no expansion vessel)

1. Turn off the mains supply to the unvented hot water cylinder
2. Open a hot water tap, preferably on the same floor or the floor below where the cylinder is located.
3. Operate the temperature and pressure relief valve until water stops flowing from tap.
4. Close the hot water tap and temperature and pressure relief valve.
5. Turn the mains supply back on and bring the cylinder up to working pressure.

Replacing air gap if lost during service (external air gap – expansion vessel fitted)

1. Turn off the mains supply to the unvented hot water cylinder
2. Open a hot water tap, preferably on the same floor or the floor below where the cylinder is located to relieve pressure.
3. Check pressure within expansion vessel. Re-pressurise to 3.0 bar if required.
4. Close the hot water tap.
5. Turn the mains supply back on and bring the cylinder up to working pressure.

6. Fault Finding

WARNING: Disconnect electrical supply before removing any electrical equipment cover.

Fault	Possible cause	Remedy
The cylinder cools down overnight	One pipe circulation in the case of short pipe networks with low pressure loss	Install a non-return valve as close as possible to the cylinder
Primary heating is not working. Boiler runs for a short period, goes off, then comes on again. This is repeated until the cylinder reaches its target temperature	Air trapped in heat exchanger Heat exchanger surface too small	Vent air from heat exchanger circuit Check data for boiler and cylinder. The problem may be solved by increasing the flow from boiler
Only cold or lukewarm water comes out of taps	Programmer set to heating only or not switched on for hot water Central heating boiler malfunction High limit thermostat has tripped Pump malfunction If only cold water comes out of taps, hot and cold pipes may have been connected up incorrectly	Set programmer to call for hot water on demand Check boiler operation. If faulty consult manufacturers instruction manual Check and re-set. The cause will need to be identified Check wiring and/or plumbing connections to pump Check connections and have them changed if necessary
Intermittent water discharge through tundish on warm up	Expansion vessel has lost its charge pressure (vessels with external expansion only) Internal air gap needs replenishing	Follow steps listed in Service & maintenance section Follow steps listed in Servicing & maintenance section
Continuous water discharge	Pressure reducing valve (PRV) not functioning properly Expansion relief valve not seating correctly Temperature & pressure relief valve not seating correctly	Check pressure from PRV. Replace cartridge if necessary Manually lift the valve once or twice to clear debris from the seat. If this does not cure problem, replace valve Manually lift the valve once or twice to clear debris from the seat. If this does not cure problem, replace valve

7. Spare parts

When ordering spare parts please contact Fabdec Sales Department and quote the part number required.

Description:		**Fabdec Part Number:**
Expansion vessel:	12 Litre	951920
	19 Litre	951921
	24 Litre	951922
Expansion vessel bracket		951918
T&P valve 7 bar 90°C		952318
15 - 22mm straight tundish		951917
3Kw Immersion heater		953409
22mm combination valve group (2 bar)		953348
22mm combination valve group (3 bar)		953349
22mm 2-port motorised valve		951878
Twin thermostat		951879A
Twin thermostat pocket (pre 2009 vessels)		953356
Solar sensor pocket		953356S
Flexible hose 1000mm		951919

8. Disposal

Disposal of packaging:

Those responsible for installing the cylinder are responsible for disposal of any transport packaging. Observe national regulations.

Cylinder disposal:

You must not dispose of the cylinder or any of its accessories in normal domestic rubbish. The cylinder and accessories must be disposed of in accordance with national regulations.

Recycling used parts:

Both the cylinder and transport packaging contain many recyclable parts

MAINS PRESSURE HOT WATER STORAGE SYSTEM COMMISSIONING CHECKLIST

This Commissioning Checklist is to be completed in full by the competent person who commissioned the storage system as a means of demonstrating compliance with the appropriate Building Regulations and then handed to the customer to keep for future reference.

Failure to install and commission this equipment to the manufacturer's instructions may invalidate the warranty but does not affect statutory rights.

Customer Name _____ Telephone Number _____

Address _____

Cylinder Make and Model _____

Cylinder Serial Number

Commissioned by *(print name)* _____ Registered Operative ID Number _____

Company Name _____ Telephone Number _____

Company Address _____

Commissioning Date _____

To be completed by the customer on receipt of a Building Regulations Compliance Certificate*:

Building Regulations Notification Number *(if applicable)* _____

ALL SYSTEMS PRIMARY SETTINGS (indirect heating only)

Is the primary circuit a sealed or open vented system?	Sealed ☐	Open ☐	
What is the maximum primary flow temperature?			°C

ALL SYSTEMS

What is the incoming static cold water pressure at the inlet to the system?				bar
Has a strainer been cleaned of installation debris (if fitted)?	Yes ☐	No ☐		
Is the installation in a hard water area (above 200ppm)?	Yes ☐	No ☐		
If yes, has a water scale reducer been fitted?	Yes ☐	No ☐		
What type of scale reducer has been fitted?				
What is the hot water thermostat set temperature?				°C
What is the maximum hot water flow rate at set thermostat temperature (measured at high flow outlet)?				l/min
Time and temperature controls have been fitted in compliance with Part L of the Building Regulations?			Yes ☐	
Type of control system (if applicable)	Y Plan ☐	S Plan ☐	Other ☐	
Is the cylinder solar (or other renewable) compatible?	Yes ☐	No ☐		
What is the hot water temperature at the nearest outlet?				°C
All appropriate pipes have been insulated up to 1 metre or the point where they become concealed			Yes ☐	

UNVENTED SYSTEMS ONLY

Where is the pressure reducing valve situated (if fitted)?				
What is the pressure reducing valve setting?				bar
Has a combined temperature and pressure relief valve and expansion valve been fitted and discharge tested?	Yes ☐	No ☐		
The tundish and discharge pipework have been connected and terminated to Part G of the Building Regulations			Yes ☐	
Are all energy sources fitted with a cut out device?	Yes ☐	No ☐		
Has the expansion vessel or internal air space been checked?	Yes ☐	No ☐		

THERMAL STORES ONLY

What store temperature is achievable?		°C
What is the maximum hot water temperature?		°C

ALL INSTALLATIONS

The hot water system complies with the appropriate Building Regulations	Yes ☐
The system has been installed and commissioned in accordance with the manufacturer's instructions	Yes ☐
The system controls have been demonstrated to and understood by the customer	Yes ☐
The manufacturer's literature, including Benchmark Checklist and Service Record, has been explained and left with the customer	Yes ☐

Commissioning Engineer's Signature _____

Customer's Signature _____

(To confirm satisfactory demonstration and receipt of manufacturer's literature)

*All installations in England and Wales must be notified to Local Authority Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer.

benchmark
COLLECTIVE MARK
THE MARK OF QUALITY FOR THE INSTALLATION, COMMISSIONING AND SERVICING OF DOMESTIC HEATING AND HOT WATER SYSTEMS

©Heating and Hotwater Industry Council (HHIC)

SERVICE RECORD

It is recommended that your hot water system is serviced regularly and that the appropriate Service Record is completed.

Service Provider
Before completing the appropriate Service Record below, please ensure you have carried out the service as described in the manufacturer's instructions.

SERVICE 1 Date

Engineer Name

Company Name

Telephone Number

Comments

Signature

SERVICE 2 Date

Engineer Name

Company Name

Telephone Number

Comments

Signature

SERVICE 3 Date

Engineer Name

Company Name

Telephone Number

Comments

Signature

SERVICE 4 Date

Engineer Name

Company Name

Telephone Number

Comments

Signature

SERVICE 5 Date

Engineer Name

Company Name

Telephone Number

Comments

Signature

SERVICE 6 Date

Engineer Name

Company Name

Telephone Number

Comments

Signature

SERVICE 7 Date

Engineer Name

Company Name

Telephone Number

Comments

Signature

SERVICE 8 Date

Engineer Name

Company Name

Telephone Number

Comments

Signature

SERVICE 9 Date

Engineer Name

Company Name

Telephone Number

Comments

Signature

SERVICE 10 Date

Engineer Name

Company Name

Telephone Number

Comments

Signature

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Water heating systems